LISTING OF CLAIMS

The Listing of Claims will replace all prior versions, and listings, of claims in the above-identified application.

Claim 1. (Currently Amended) A three-dimensional polymeric coordination compound characterized by a plurality of sheets comprising a two-dimensional array of repeating structural units, each repeating structural unit ~~comprising~~ consisting of a transition metal center ~~consisting of one or more transition metal atoms~~, wherein each transition metal center is coordinated to:

a) one binding site of an exodentate bridging ligand; and

b) at least one binding member of a bidentate binding site on each of two polyfunctional ligands,

wherein: (1) at least one binding member of a second bidentate binding site on each said polyfunctional ligand is further coordinated to at least one transition metal atom in a different repeating structural unit within the same said sheet containing a two-dimensional array of repeating structural units; (2) the exodentate bridging ligand extends essentially perpendicularly from a plane characteristic of said sheet containing a two-dimensional array of repeating structural units to further coordinate with a transition metal atom in a repeating structural unit in an adjacent sheet; (3) the polyfunctional ligand is a ligand having at least two bidentate coordination sites; and (4) the exodentate ligand is an aromatic ligand having two monodentate binding sites, that are substitutionally labile when contacted with an excess of water,

wherein the polyfunctional ligand compounds and the exodentate ligand compounds are selected so that (i) substitution of the exodentate ligands is more facile than substitution of the polyfunctional ligands by a ligand having a single, monodentate coordination site, which, in combination with said substitutional lability, permits interconversion between said three-dimensional compound structure and lower dimensional starting materials, and (ii) the ligands of the three-dimensional polymeric compound define channels and pores of molecular

size throughout the structure of the compound.

Claim 2. (Currently Amended) ~~The compound of claim 1~~ A three-dimensional polymeric coordination compound characterized by a plurality of sheets comprising a two-dimensional array of repeating structural units, wherein [[the]] each repeating structural unit of the compound has the stoichiometric formula $[M_a(pbd)_b ed_f]\cdot x(sol)\cdot z\ H_2O$, where "M" is a transition metal selected from the group of transition metals having in at least one stable oxidation state classified as a Pearson soft or borderline acid, and which, in some oxidation state, can form stable bonds with ligands selected from the group consisting of ligands classified as Pearson hard bases and ligands classified as Pearson borderline bases, "pbd" is a polyfunctional ligand having at least two bidentate binding sites, "ed" is an exodentate ligand having at least two monodentate binding sites, sol is one or more members of the group selected from polar solvents, "a" and "b" are integers and the coordinate space occupied by the pbd and ed ligands is equal to a stable coordination number of "a" number of M transition metal atoms, and wherein "x" and "z" are any number of solvent molecules including zero.

Claim 3. (Original) The compound of Claim 2 wherein "M" is cobalt, "pbd" is biphenyl – 4,4' – dicarboxylate, "ed" is 4,4' – bipyridine, "sol" = dimethyl formamide, "a" and "b" = 3, "f" = 1, "x" = 4, and "z" = 1, the compound being further characterized in that the three cobalt atoms of the repeating structural unit are arranged such that one octahedral coordinate cobalt atom resides between two cobalt atoms having trigonal bipyramidal coordination, the octahedral ligands comprising one oxygen atom (a binding member) of a bidentate binding site of each of six biphenyl- 4, 4'-dicarboxylate polyfunctional ligands, the trigonal bipyramidal ligands comprising one oxygen atom of a bidentate binding site of each of two biphenyl- 4, 4'-dicarboxylate polyfunctional ligands, two oxygen atoms of one additional bidentate binding site of a biphenyl- 4, 4'-dicarboxylate polyfunctional ligand, and the nitrogen of one monodentate binding site of a 4, 4'-bipyridine exodentate ligand.

Claims 4 – 11. (Canceled)

Claim 12. (Original) The compound of claim 1 wherein the repeating structural unit of the compound has the stoichiometric formula [M(pbd)ed]·x(sol)], where "M" is a transition metal selected from the group of transition metals having in at least one stable oxidation state classified as a Pearson soft or borderline acid, and which, in some oxidation state, can form stable bonds with ligands selected from the group consisting of ligands classified as Pearson hard bases and ligands classified as Pearson borderline bases, "pbd" is a polyfunctional ligand having at least two bidentate binding sites, "ed" is an exodentate ligand having at least two monodentate binding sites, sol is one or more members of the group selected from polar solvents, and "x" is any number, including fractions and zero.

Claim 13. (Original) The compound of Claim 12 wherein "M" is cobalt, "pbd" is biphenyl – 4,4' – dicarboxylate, "ed" is 4,4' – bipyridine, "sol" = dimethyl formamide, and "x" = 0.5, the compound being further characterized in that it has a repeating structural unit comprising two cobalt atoms having octahedral coordination, the coordinating ligands comprising four equatorial biphenyl- 4,4'-dicarboxylate ligands wherein one oxygen atom (a binding member) of one bidentate binding site of each of two biphenyl- 4,4'-dicarboxylate polyfunctional ligands is coordinated to each of the cobalt atoms, forming a bridge between said cobalt atoms, and one bidentate binding site of each of two additional biphenyl- 4,4'-dicarboxylate ligand is coordinated to each cobalt atom, and wherein each cobalt atom of said repeating structural unit is apically coordinated to the nitrogen of one monodentate binding site of each of two 4,4'-bipyridine exodentate ligands.

Claim 14. (Canceled)